

PUBLICATIONS AND PRESENTATIONS RESULTING FROM THE EXPERIMENTS

UNITED STATES MICROGRAVITY LABORATORY 1 (USML-1) STS-50 ABOARD COLUMBIA JUNE 25 - JULY 9, 1992

CANDLE FLAMES IN MICROGRAVITY 1 (CFM-1)

Dietrich, D. L., Ross, H. D., and T'ien, J. S. "Candle Flames in Non-Buoyant and Weakly Buoyant Atmospheres." AIAA Paper, 94-0429, January 1994.

Dietrich, D. L., Ross, H. D., and T'ien, J. S. "Candle Flames in Microgravity." Third International Microgravity Combustion Workshop. Cleveland, Ohio. (1995).

Grayson, G., Sacksteder, K. R., Ferkul, P. V., and T'ien, J. S. Microgravity Science and Technology, Vol. VII, (2): 187 (1994).

SMOLDERING COMBUSTION IN MICROGRAVITY (SCM)

Stocker, D. P., Olson, S. L., Urban, D., Torero, J. L., Walther, J. L., and Fernandez-Pello, A.C., "Small Scale Smoldering Combustion Experiments in Microgravity." Twenty-Sixth Symposium (International) on Combustion: Naples, Italy. July 1996. pp. 1361-1368.

Stocker, D. P., Olson, S. L., Torero, J. L., and Fernandez-Pello, A. C., "Microgravity Smoldering Combustion on the USML-1 Space Shuttle Mission." Proceedings of the Third International Microgravity Combustion Workshop: Cleveland, OH. April 11-13, 1995.

Stocker, D. P., Olson, S. L., Torero, J. L., and Fernandez-Pello, A. C., "Microgravity Smoldering Combustion on the USML-1 Space Shuttle." Joint Launch + One Year Science Review of the USML-1 and USMP-1 with the Microgravity Measurement Group. NASA Conference Publication 3272, Vol. II, May 1994.

Stocker, D. P., Olson, S. L., Torero, J. L., and Fernandez-Pello, A. C., "Microgravity Smoldering Combustion on the USML-1 Space Shuttle Mission." ASME HTD, Vol. 269, Heat Transfer in Microgravity, pp. 99-110, 1993.

UNITED STATES MICROGRAVITY LABORATORY 2 (USML-2)
STS-73 ABOARD COLUMBIA
OCTOBER 20 - NOVEMBER 5, 1995

COLLOIDAL DISORDER-ORDER TRANSITION (CDOT)

"Effect of Sedimentation on the Crystallization of Colloidal Hard Spheres," W. B. Russel, J. X. Zhu, R. B. Rogers, W. V. Meyer, and P. M. Chaikin, AIChE Annual Meeting, November 1995.

P. M. Chaikin, APS, March 1996.

J. X. Zhu, P. M. Chaikin, L. Min, W. B. Russel, W. V. Meyer, and R. B. Rogers, "The Structure and Dynamics of Hard Sphere Colloidal Crystals Under Microgravity with Quasi-Elastic Light Scattering," in *Photon Correlation & Scattering*, Vol. 14, 1996 OSA Technical Digest Series (Optical Society of America, Washington DC, 1996) pp. 58-60, (presented at the Optical Society of America's PCS Topical Meeting. Capri, Italy. August 21-24, 1996).

R. B. Rogers, W. V. Meyer, J. X. Zhu, W. Turner, P. M. Chaikin, and W. B. Russel, "A Compact Laser Light Scattering Instrument for Microgravity Research," in *Photon Correlation & Scattering*, Vol. 14, 1996 OSA Technical Digest Series (Optical Society of America, Washington DC, 1996), pp. 23-25, (presented at the Optical Society of America's PCS Topical Meeting. Capri, Italy. August 21-24, 1996).

P. M. Chaikin, "Light Scattering and Photon Correlation Spectroscopy," Advanced Studies Institute, Krakow, August 1996.

P. M. Chaikin, "Hard Spheres in Space, Colloidal Crystals in Microgravity," September 16, 1997, University of Amsterdam.

J. X. Zhu, M. Li, R. B. Rogers, W. V. Meyer, R. H. Ottewill, STS-73 Space Shuttle Crew, W. B. Russel, and P. M. Chaikin, "Crystallization of hard sphere colloids in microgravity," *Nature*, 387, 883-885 (1997).

W. B. Russel, P. M. Chaikin, J. X. Zhu, W. V. Meyer, and R. B. Rogers, "Dendritic growth of hard sphere crystals," *Langmuir*, 13, 3871-3881 (1997).

R. B. Rogers, W. V. Meyer, J. X. Zhu, P. M. Chaikin, W. B. Russel, M. Li, and W. B. Turner, "Compact laser light-scattering instrument for microgravity research," *Applied Optics*, Vol. 36, No. 30, 7493-7500 (1997).

FIBER SUPPORTED DROPLET COMBUSTION 1 (FSDC-1)

Dietrich, D. L., Haggard, J. B. Jr., Dryer, F. L., Nayagam, V., Shaw, B. D., and Williams, F. A., "Droplet Combustion Experiments in Spacelab," Twenty-Sixth Symposium (International) on Combustion. The Combustion Institute, pp. 1201-1207 (1996).

Marchese, A. J., Dryer, F. L., Colantonio, R. C., and Nayagam, V., "Combustion of Methanol and Methanol/Water Droplets: Droptower Results and Model Predictions," Twenty-Sixth Symposium (International) on Combustion. The Combustion Institute, (1996).

Marchese, A. J., and Dryer, F. L., *Combustion Flame*, Vol. 105, pp. 104-122 (1996).

Zhang, B. L., Card, J. M., and Williams, F. A., *Combustion Flame*, Vol. 105, pp. 267-290 (1996).

Nayagam, V., and Williams, F. A., "Dynamics of Diffusion Flame Oscillations Prior to Extinction During Low-Gravity Droplet Combustion," Seventh International Conference on Numerical Combustion. York, England, (1988).

UNITED STATES MICROGRAVITY PAYLOAD 3 (USMP-3)

STS-75 ABOARD COLUMBIA

FEBRUARY 22 - MARCH 9, 1996

COMPARATIVE SOOT DIAGNOSTICS (CSD)

Urban, D. L., Griffin, D. W., and Gard, M. Y. "Detection of Smoke from Microgravity Fires." Proceedings from the Technical Meeting of the Central States Section of the Combustion Institute (1997).

FORCE FLOW FLAME SPREADING TEST 1 (FFFT-1)

West, J., Tang, L., Altenkirch, R. A., Bhattacharjee, S., Sacksteder, K. R., and Delichatsios, M., "Quiescent Flame Spread Over Thick Fuels in Microgravity," Twenty-Sixth Symposium (International) on Combustion, The Combustion Institute, 1994.

RADIATIVE IGNITION AND TRANSITION TO SPREAD INVESTIGATION (RITSI)

McGrattan, K. B., Kashiwagi, T., Baum, H. R., and Olson, S. L., *Combustion Flame*, 106: 377-391 (1996).

Kashiwagi, T., McGrattan, K. B., Olson, S. L., Fujita, O., Kikuchi, M., and Ito, K., "Effects of Slow Wind on Localized Radiative Ignition and Transition to Flame Spread in Microgravity," *Twenty-Sixth Symposium (International) on Combustion*. Naples, Italy. July 1996, pp. 1345-1352.

Kashiwagi, T., and Olson, S. L., "Radiative Ignition and Transition to Spread Investigation," Joint L+1 Science Review of USML-2 and USMP-3, Proceedings of a conference held at the National Academy of Sciences. Washington, D. C., February 1997.

Kashiwagi, T., Mell, W. E., McGrattan, K. B., Baum, H. R., Olson, S. L., Fugita, O., Kikuchi, M., Ito, K., "Ignition, Transition, Flame Spread in Multidimensional Configurations in Microgravity," proceedings of the *Fourth International Microgravity Combustion Workshop*. Cleveland, Ohio. May 19-21, 1997.

Fujita, O., Kikuchi, M., Ito, K., Olson, S. L., Kashiwagi, T., and Sakuraya, T., "Observations of Ignition and Flame Spread of Paper Sheet in Slow External Flow under Microgravity," *Japanese Journal for Microgravity Researches (Japan Society of Microgravity Application)*, Vol. 14, No. 1, pp. 25-33. 1997.

MIR INCREMENT 2

PRIRODA

APRIL 23, 1996

FORCED FLOW FLAME SPREADING TEST 2 (FFFT-2)

West, J., Tang, L., Altenkirch, R. A., Bhattacharjee, S., Sacksteder, K. R., and Delichatsios, M., "Quiescent Flame Spread Over Thick Fuels in Microgravity," *Twenty-Sixth Symposium (International) on Combustion*, The Combustion Institute, 1994.

Sacksteder, K. R., Greenburg, P. S., Ferkul, P. V., Pettegrew, R. D., T'ien, J. S., and Kashiwagi, T., "Observations of Burning Wire Insulation in the Microgravity Environment of an Orbiting Spacecraft," *Twenty-Seventh Symposium (International) on Combustion*, 1998.

MICROGRAVITY SCIENCE LABORATORY 1R (MSL-1R)
STS-94 ABOARD COLUMBIA
JULY 1-17, 1997

CAPILLARY-DRIVEN HEAT TRANSFER (CHT)

Allen, J. S. and Hallinan, K. P., "A Study of the Fundamental Operation of a Capillary Driven Heat Transfer Device in Microgravity," presented at the National Heat Transfer Conference, Baltimore, Maryland. August 10-12, 1997.

Allen, J. S., Hallinan, K. P., and Lekan, J., "A Study of the Fundamental Operation of a Capillary Driven Heat Transfer Device in Both Normal and Low Gravity -- Part I. Liquid Slug Formation in Low Gravity," presented at the Space Technology and Applications International Forum, Albuquerque, New Mexico. January 25-29, 1998.

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| Microgravity Newsletter | mgnwww.larc.nasa.gov/ |
| Microgravity Meetings List | zeta.grc.nasa.gov/ugml/ugml.htm |
| Combustion and Fluids Experiments | zeta.grc.nasa.gov/sedhome.htm |
| International Space Station | station.nasa.gov/core.html |
| Space Shuttle | shuttle.nasa.gov/index.html/ |

CREDITS

MICROGRAVITY GLOVEBOX CREDITS

For the USML-1 and USML-2 missions, the Microgravity Glovebox was developed by the European Space Agency/ESTEC, Brunel Institute for Bioengineering (United Kingdom), and Bradford Engineering (The Netherlands). For all other flights, the Microgravity Glovebox was developed by Teledyne Brown Engineering (Huntsville, Alabama) and Bradford Engineering (Netherlands) under contract to NASA Marshall Space Flight Center.

PHOTOGRAPHY CREDITS

Photographs of the Demon Drop and Magnum XL-200 were the courtesy of Cedar Point Amusement Park in Sandusky, Ohio. The photographer was Dan Feicht.

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